Washington's Safe System Approach

The Safe System Approach (SSA) recognizes that safety is increased when we examine how all parts of the system interact to support and strengthen all parts of the system. The Washington State SSA provides a framework for operationalizing traffic safety among policy makers, system owners and operators, and road users. This approach reflects the obvious truth that preventing death and serious injury requires multiple elements to be in place so that if one fails, other layers of protection are available to prevent the most tragic outcomes.

Safe System Approach Principles

Washington's SSA framework is based on six principles, starting with the value statement: deaths and serious injuries are unacceptable. The Safe System is not designed to prevent all crashes, but to eliminate serious and fatal injuries that result from some crashes. The principles also address the primary reason for injury outcomes (prevent exposure to large forces) and required actions (safety is proactive, support safe road user behaviors, and shared responsibility). The principles finish with the defining feature of the interdependent Safe System Approach: strengthen all parts.

1. Death and serious injury are unacceptable: Everyone deserves to travel safely to their destination whether they drive a car, take the bus, walk, roll, or bicycle.
2. Shared responsibility: The transportation system is comprised of many elements that influence each other, with many partners who are responsible for these different elements. System owners, planners, and policy makers bear the greatest

responsibility, but everyone shares responsibility to keep themselves and others safe.

3. Support safe road user behavior: A safe system encourages safe behavior, removes conditions that may encourage violation of those standards, and protect against fatal consequences when errors inevitably occur.
4. Prevent exposure to large forces: A vehicle's speed and mass determine the force of a collision. The Safe System reduces the exposure of human bodies by reducing forces and/or exposure to crash forces.
5. Safety is proactive: Serious crashes are preventable, and the most effective countermeasures reduce crash risks and exposure to lethal forces.
6. Strengthen all parts: All elements (described below) are supported and strengthened so that there are multiple system layers that effectively reduce risk and exposure to crash forces.

ELEMENT 1: SAFER LAND USE

When land use and transportation are planned efficiently, the necessities of daily life can be closer together and easier to access, which makes active transportation modes more viable and results in fewer motor vehicle trips. This reduces exposure to crashes, promotes walking and biking, reduces congestion and air pollution, and contributes to a prosocial traffic safety culture. The land use and transportation systems work together to create the network within which people operate and interact with one another and the adjacent land use.

ELEMENT 2: SAFER ROAD USERS

Road user decisions and behaviors fundamentally increase or decrease the likelihood of a crash occurring and the severity of a crash when it occurs. In Washington, at least 3 out of every four fatal crashes involve one or more high-risk behaviors: impairment, speed, distraction, or lack of passenger restraints. For instance, drivers choosing to drive impaired by substances have slower reaction times and make poor driving decisions. Road users who prioritize convenience over safety shows up as red light running, speeding, motorcyclists splitting lanes to ride between vehicles, or active transportation users crossing against a Don't Walk traffic signal.

Developing a prosocial traffic safety culture is important to support safe road use. Education includes formal training as well as information and reminders for all road users to travel safely. In addition to education, enforcement provides reminders and deterrence to reduce high-risk behaviors, as well as intervention to stop dangerous, crash-causing behaviors, such as impaired driving, distracted driving, and speeding.

ELEMENT 3: SAFER VEHICLES

Vehicle design serves multiple goals, including the safety of those inside the vehicle. Ideally, vehicles are designed and regulated to facilitate safe driving behaviors and minimize the frequency and severity of crashes using safety measures that incorporate the latest technologies. Vehicles with increased mass will increase the magnitude of the transfer of force when a crash occurs.

Vehicle safety improvements over the past few decades have decreased crash forces for vehicle occupants. However, federal regulations have not prioritized improving safety for people outside the vehicle. Vehicles continue to increase in size and power. Clearly, there is a need to improve vehicle design features for safety. There are also new technologies being developed that should be standardized across all vehicles, including technology on the horizon to improve pedestrian detection in automatic braking systems, detection systems that can disable the ignition if impairment is detected, and automatic speed limiters that restrict a driver from exceeding posted speeds. Safety ratings should also evolve to holistically consider all aspects of safety for drivers, other vehicle occupants, and all road users who could be exposed to a crash with the vehicle.

ELEMENT 4: SAFER ROADS

In the safe system, roadways are designed to reduce conflicts among all road users, including people driving personal and commercial vehicles, transit operators, pedestrians, and bicyclists. Because conflicts cannot be eliminated completely, designing transportation infrastructure to accommodate human mistakes and injury tolerances can reduce the severity of crashes that do occur. Examples include physically separating people using different modes and traveling at different speeds, providing dedicated times for different users to move through a location, and alerting users to objects, encroaching vehicles, and other road users.

Washington introduced the Safe System Hierarchy of Controls in 2019, a framework prioritizing policies and countermeasures based on their effectiveness. This structure guides WSDOT in design and operational decision-making, supporting the Complete Streets approach and evaluating roadways using the Level of Traffic Stress (LTS) index, which measures factors like roadway width, speed, and traffic volume.

Self-explaining and self-enforcing roadway designs encourage safe behavior, reducing the potential for fatal or serious injury crashes. Roundabouts are a good example of self-explaining designs that reduce exposure to crashes by dramatically decreasing the number and type of road user conflicts; reducing the impact angle of vehicles; lowering drivers' operating speeds in the intersection; guiding traffic from all directions in a circular path;

and separating traffic by designating travel lanes. Roundabouts also make crossing distances shorter for those walking and biking.

ELEMENT 5: SAFER SPEEDS

Reducing driver speeds is critical for eliminating serious and fatal injury crashes in three ways: expanding drivers' field of vision, providing additional time and space for drivers to stop, and reducing impact forces. As speed increases, so does the likelihood of a crash occurring because drivers experience a narrowing of vision, increased response times, and longer stopping distances. Additionally, as the driver's speed increases, all other users who interact with that driver are less able to judge or react.

Increased driver speed dramatically increases the force of a crash. Kinetic energy increases exponentially with speed, which means that the risk of serious and fatal injury, particularly for walkers and rollers, increases dramatically with the speed of a striking vehicle.

Planners and engineers communicate target speeds to drivers by selecting and modifying roadway conditions, setting posted speed limits, and designing the look and feel of the roadway's cross section to provide cues for appropriate speeds. Safer speeds are further supported by land use context and communication of regulatory speed limits through signing, driver education, social norms, legal standards, and enforcement.

ELEMENT 6: POST-CRASH CARE

Timely and appropriate emergency medical response to traffic crashes saves lives and reduces the severity of injury outcomes. Nearly 40% of all deaths from roadway crashes did not occur at the crash scene. Many trauma-related deaths are preventable with timely access to effective, organized emergency medical services and trauma care systems. People who are injured in crashes rely on first responders to quickly locate and stabilize their injuries and transport them to medical facilities. Post-crash care also includes forensic analysis at the crash site, traffic incident management, and other activities.

This summary of the Washington Safe System Approach includes excerpts from the 2024 Target Zero plan, which can be found at https://targetzero.com/.